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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/027,362	12/26/2001	Akira Shimada	S004-4517	9666

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EXAMINER

VOELTZ, EMANUEL T

ART UNIT	PAPER NUMBER
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2121

DATE MAILED: 07/01/2004

7

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/027,362

Applicant(s)

SHIMADA ET AL.

Examiner

Emanuel T. Voeltz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 December 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4 is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.



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Examiner's Detailed Office Action

This action is in response to patent application number 10/027,362, filed December 26, 2001.

Claims 1-10 have been examined.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on May 1, 2003 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Response to Amendment

The amendment to the claims filed on July 16, 2003 does not comply with the requirements of 37 CFR 1.121(c) because deleting claim language from a claim should be bracketed ([]) and not struck through as has been presented in the preliminary amendment.

Amendments to the claims filed on or after July 30, 2003 must comply with 37 CFR 1.121(c) which states:

(c) *Claims.* Amendments to a claim must be made by rewriting the entire claim with all changes (e.g., additions and deletions) as indicated in this subsection, except when the claim is being canceled. Each amendment document that includes a change to an existing claim, cancellation of an existing claim or addition of a new claim, must include a complete listing of all claims ever presented, including the text of all pending and withdrawn claims, in the application. The claim listing, including the text of the claims, in the amendment document will serve to replace all prior versions of the claims, in the application. In the claim listing, the status

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of every claim must be indicated after its claim number by using one of the following identifiers in a parenthetical expression: (Original), (Currently amended), (Canceled), (Withdrawn), (Previously presented), (New), and (Not entered).

(1) *Claim listing.* All of the claims presented in a claim listing shall be presented in ascending numerical order. Consecutive claims having the same status of "canceled" or "not entered" may be aggregated into one statement (e.g., Claims 1–5 (canceled)). The claim listing shall commence on a separate sheet of the amendment document and the sheet(s) that contain the text of any part of the claims shall not contain any other part of the amendment.

(2) *When claim text with markings is required.* All claims being currently amended in an amendment paper shall be presented in the claim listing, indicate a status of "currently amended," and be submitted with markings to indicate the changes that have been made relative to the immediate prior version of the claims. The text of any added subject matter must be shown by underlining the added text. The text of any deleted matter must be shown by strike-through except that double brackets placed before and after the deleted characters may be used to show deletion of five or fewer consecutive characters. The text of any deleted subject matter must be shown by being placed within double brackets if strike-through cannot be easily perceived. Only claims having the status of "currently amended," or "withdrawn" if also being amended, shall include markings. If a withdrawn claim is currently amended, its status in the claim listing may be identified as "withdrawn—currently amended."

(3) *When claim text in clean version is required.* The text of all pending claims not being currently amended shall be presented in the claim listing in clean version, i.e., without any markings in the presentation of text. The presentation of a clean version of any claim having the status of "original," "withdrawn" or "previously presented" will constitute an assertion that it has not been changed relative to the immediate prior version, except to omit markings that may have been present in the immediate prior version of the claims of the status of "withdrawn" or "previously presented." Any claim added by amendment must be indicated with the status of "new" and presented in clean version, i.e., without any underlining.

(4) *When claim text shall not be presented; canceling a claim.*

(i) No claim text shall be presented for any claim in the claim listing with the status of "canceled" or "not entered."

(ii) Cancellation of a claim shall be effected by an instruction to cancel a particular claim number. Identifying the status of a claim in the claim listing as "canceled" will constitute an instruction to cancel the claim.

(5) *Reinstatement of previously canceled claim.* A claim which was previously canceled may be reinstated only by adding the claim as a "new" claim with a new claim number.

Since the reply filed on July 16, 2003 appears to be *bona fide*, and in the essence of not extending prosecution on the merits for an extra thirty (30) days, the examiner has taken extra time to set forth the claims in the rejection with all amendments to the claims. Applicant is requested to follow 37 C.F.R. 1.121 with all future amendments.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the mathematical model as set forth in claim 3 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent

5,547,296, granted to Iwazawa.

Regarding claim 1,

A disturbance estimated-type control system comprising:

a control object (See figure 2, Motor 16);

disturbance estimating means for estimating a disturbance of the control object in accordance with art input signal inputted into the control object and a detection signal detected from the control object (see figure 2, Equivalent Disturbance Compensator);

compensating means for compensating for a deviation between the detection signal and a target value and for outputting a corresponding control signal (see figure 2, Motor Speed Compensator); and

subtracting means for subtracting the control signal of the compensating means from a disturbance estimated value of the disturbance estimating means (see figure 2, Adder 32).

Regarding claim 7,

A disturbance estimated-type control system comprising:

a control object (See figure 2, Motor 16);

a disturbance estimating device for estimating a disturbance of the control object in accordance with an input signal inputted into the control object and a detection signal detected from the control object (see figure 2, Equivalent Disturbance Compensator);

a compensator for compensating for a deviation between the detection signal and a preselected value of the detection signal and for outputting a corresponding control signal (see figure 2, Motor Speed Compensator); and

a subtractor for subtracting the control signal of the compensator from a disturbance estimated value of the disturbance estimating device (see figure 2, Adder 32).

Claims 3 and 5 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent

6,411,461 B1, granted to Szita.

Regarding claim 3,

A method of designing a disturbance estimated-type control system, comprising the steps of:
providing a control object (see Szita, figure 3, measured actuator position);

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preparing a mathematical model of the control object (see Szita, figure 3, Actuator Model 140); providing an expanded state equation comprised of the mathematical model of the control object and a mathematical model of a disturbance applied to the control object; designing from the expanded state equation a disturbance estimating device for estimating the disturbance of the control object in accordance with an input signal inputted into the control object and a detection signal detected from the control object (see Szita, figure 3, estimation disturbance 206); designing from the mathematical model of the control object a compensating device for compensating for a deviation between the detection signal and a target value and for outputting a control signal (see Szita, figure 3, Controller 104); and subtracting the control signal of the compensating device from a disturbance estimated value of the disturbance estimating device (see Szita, figure 3, signals 108 & 204 near input side of Controller 104).

Regarding claim 5,

A disturbance estimating-type control system according to claim 1; further comprising means for designing the compensating means utilizing a first mathematical model of the control object; and means for designing the disturbance estimating means utilizing an expansion system comprised of the mathematical model (see Szita, figure 3, estimated disturbance 206 and actuator model 104).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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Claims 2, 6, 8, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over patent granted to Iwazawa as set forth above in view of Japanese Patent JP02001227825 A, granted to Ijiri.

Regarding claim 2,

A gas compressor control system comprising:
a variable displacement type gas compressor having a compressing chamber and an evaporator (see Ijiri, abstract);
displacement altering means for altering a displacement of gas in the compressing chamber of the variable displacement type gas compressor (see Iwazawa, figure 2, Equivalent Disturbance Compensator);
input means for inputting an input signal into the displacement altering means (see Iwazawa, figure 2, Equivalent Disturbance Compensator);
detecting means for detecting a detection corresponding to one of ambient air temperature, air temperature at an outlet of the evaporator, a flow of a refrigerant flowing through the variable displacement type gas compressor, and a pressure of the refrigerant on a suction side of the compressing chamber (see Iwazawa, figure 2, Motor Speed 20);
disturbance estimating means for estimating a disturbance of the variable displacement type gas compressor in accordance with the detection signal detected by the detecting means and the input signal input into the displacement altering means (see Iwazawa, figure 2, Equivalent Disturbance Compensator);
compensating means for compensating for a deviation between the detection signal and a target value and for outputting a corresponding control signal (see Iwazawa, figure 2, Motor Speed Compensator); and
subtracting means for subtracting the control signal of the compensating means from a disturbance estimated value of the disturbance estimating means (see Iwazawa, figure 2, Adder 32).

The patent to Iwazawa discloses controlling the velocity of a printhead that meets all of the limitations in the claim; however, Iwazawa does not disclose using his control system in a variable displacement gas compressor. The patent to Ijiri teaches controlling a variable displacement gas compressor. It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the controlling method of Iwazawa in a variable displacement gas

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compressor as taught by Shimada et al. because both patentees are trying to solve similar issues, namely, maintaining control of a controlled object without the object exceeding thresholds.

Regarding claim 6,

A gas compressor control system according to claim 2; wherein the disturbance of the variable displacement type gas compressor comprises a variation in the number of rotations of the variable displacement type gas compressor (see Ijiri, see abstract).

It would have been further obvious to select a different control object based upon the need and/or environment in which the control object will operate.

Regarding claim 8,

A disturbance estimated-type control system according to claim 7; wherein the control object comprises a variable displacement-type gas compressor (see Ijiri, see abstract).

It would have been further obvious to select a different control object based upon the need and/or environment in which the control object will operate.

Regarding claim 9,

A disturbance estimated-type control system according to claim 8; wherein the variable displacement-type gas compressor comprises an evaporator and a compression chamber; and wherein the detection signal comprises one of an air temperature at art outlet of the evaporator and a refrigerant pressure on a suction side of the compression chamber (see Ijiri, see abstract).

It would have been further obvious to select a different control object based upon the need and/or environment in which the control object will operate.

Regarding claim 10,

A gas compressor control system according to claim 7; wherein the disturbance of the variable displacement-type gas; compressor comprises a variation in the number of rotations of the variable displacement type gas compressor (see Ijiri, see abstract).

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It would have been further obvious to select a different control object based upon the need and/or environment in which the control object will operate.

Prior Art of Record

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The various patents are cited for showing the general state of the art in control systems for controlled objects and variable displacement-type gas compressor systems.

Allowable Subject Matter

The following is an examiner's statement of reasons for allowance: The claims are allowable over the prior art of record because none of the references taken individually or in combination disclose or teach a method of designing a disturbance estimated-type control system according to claim 3; further comprising the steps of determining whether or not the expanded state equation is observable and, if it is determined to be unobservable, compulsorily adding an error of 10% or less to a coefficient corresponding to an A matrix and/or a C matrix of the expanded state equation or to a zero-th dimension term of a transfer function numerator of the mathematical model of the control object and preparing an expansion system including the error to thereby establish observability.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Correspondence Information

Any inquiries concerning this communication or earlier communications from the

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examiner should be directed to **Emanuel Todd Voeltz** who may be reached via telephone at **(703) 305-4563**. The examiner can normally be reached Monday through Friday between the hours of 8:00 a.m. and 5:00 p.m. eastern standard time.

If you need to send an Official facsimile transmission, please send it to **(703) 872-9306**.

If you would like to send a Non-Official (draft) facsimile transmission the fax is **(703) 746-5104**.

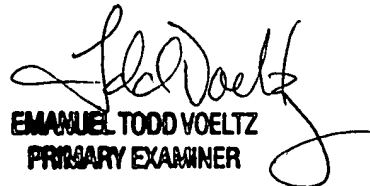
If attempts to reach the examiner by telephone are unsuccessful, the Examiner's Supervisor,

Anthony Knight, may be reached at **(703) 308-3179**.

Any response to this office action should be mailed too: **Director of Patents and Trademarks Washington, D.C. 20231**.

Moreover, hand-delivered responses should be delivered to the Receptionist, located on the **fourth floor of Crystal Park 11, 2121 Crystal Drive Arlington, Virginia**.

Emanuel Todd Voeltz
Primary Patent Examiner
Art Unit 2121
United States Department of Commerce
Patent & Trademark Office


EMANUEL TODD VOELTZ
PRIMARY EXAMINER